

an end shell;
a locking sleeve;
a spring connected between the end shell and the locking sleeve defining a passage;
a mesh connected between the end shell and the locking sleeve; wherein the mesh substantially surrounds the spring;
the electrical connection means further comprising a bundle connected to the locking sleeve, wherein said bundle is configured to pass at least one electrical signal and optionally, at least one fluid through said passage.

71. The device of claim 28, further comprising flexible connectors for connecting each module to the module adjacent thereto.

72. The device of claim 28, further comprising at least one centralizer connected to each of the modules.

REMARKS

The Examiner has imposed a requirement under 35 U.S.C. § 121 to elect a single species for prosecution on the merits. The Examiner had determined that the species disclosed in Figures 1, 5A&B, 5E&F, 12, 15/16, 21, 25, 28A, 29, 30AE, 30C, 30K, 30R, 30X, and 43 are distinct and that there was no generic claim. Applicants elect the species of Fig. 12, which shows an embodiment of the base module. Each of amended claims 1, 28 and 46, and the claims that depend from each of them, include a base module, but no claim includes only a base module. Claims 2 through 27 and new claims 55 through 70 depend from claim 1 and recite various possible combinations of the modules and associated components. Independent claim 28, and claims 29 through 31 and new claims 71 and 72 that depend from claim 28, are directed to a specific embodiment including a base module in combination with several other modules. Claims 46 and 47 depend from claim 44. Both, therefore, include a base module. The possible combinations of modules are best shown in Figs. 2A through 2G, and particularly in Fig. 2C.

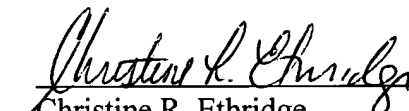
Amended claim 1 is generic to the combinations shown in Figs. 1 and 2A through 2G. Amended claim 1 also recites a flexible joint, one embodiment of which is shown in Figure 29.

The Examiner had also stated that the devices set forth in claims 1, 6, 12 and 21 have no clear figure related to them. The embodiment of claim 1, prior to amendment, was shown in Fig. 2D. Claim 3 now recites the combination of the base module and the camera formerly in claim 1. The embodiment of claim 6 is shown in Fig. 2E. The embodiment of claim 12 is shown in Fig. 2F. The embodiment of claim 21 is shown in Fig. 2G.

Applicants have amended the claims to provide a generic claim for the combination of modules and have made conforming amendments to the dependent claims. Errors in numbering the claims have also been corrected. Basis for the amendment to claim 1 can be found in the Specification, for example, at page 14, line 16 (tooling module) and page 28, line 15 (microprocessor) and in original claim 8 (flexible joint). New claims have been added that further define the combination of modules and associated components of the invention. Basis can be found throughout the Specification and in the drawings.

If the undersigned can be of assistance to the Examiner in advancing the application to allowance, the Examiner is encouraged to contact the undersigned at the number set forth below.

Respectfully submitted,


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VERSION WITH MARKINGS TO SHOW CHANGES MADE

1. (Amended) A multi-module pipe repair inspection device, comprising:
 - a base module;
 - a microprocessor;
 - at least one tooling module; and
 - at least one flexible joint having electrical connection means, said joint flexibly and electrically connecting [and
 - a camera module connected to] the base module to one of the at least one tooling module.
2. (Amended) The device of claim 1, further comprising a locomotor module [connected to] positioned between the base module and the tooling module.
3. (Amended) The device of claim 1, wherein the tooling module is a camera module [further comprising a flexible joint connected between the base module and the camera module].
4. (Amended) The device of claim [1] 3, further comprising a centralizer connected to the camera module.
6. (Amended) The device of claim 1 wherein the tooling module is [A multi-module pipe marking device, comprising:
 - a base module;]
 - a marker module connected to the base module[;] and the device further comprises
 - an MFL module connected to a marker module.
7. (Amended) The device of claim 6, further comprising a locomotor module connected between [to] the base module and the marker module.
8. (Amended) The device of claim [6] 7, further comprising a flexible joint connected between the [base] locomotor module and the marker module.

12. (Amended) [A multi-module pipe preparation] The device of claim 1, [comprising:
a base module;] wherein the tooling module is
a sensor module connected to the base module; and the device further comprises
a brush module connected to the sensor module.

15. (Amended) The device of claim 12, further comprising a locomotor module connected
between [to] the base module and the sensor module.

21. (Amended) [A multi-module pipe repair] The device of claim 1 wherein the tooling module
is [, comprising:
a base module; and]
a patch set/test module.

(Amended) [23] 24. The device of claim 23, further comprising a flexible joint connected
between the bladder module and the supply module, said joint having means for fluid connection
between the bladder and supply modules.

(Amended) [24] 25. The device of claim 23, wherein the supply module includes at least one
tank and a regulator for regulating gas entry and exit from the tank.

(Amended) [25]. 26 The device of claim 23, wherein the bladder module includes an inflatable
bellows for setting a patch to a wall of a pipe.

(Amended) [26] 27. The device of claim 21, further comprising a locomotor module
connected[to] between the base module and the patch set/test module.

(Amended) [27] 28. A multi-module pipe inspection and repair device, comprising:
a base module;
a camera module;

a sensor module;
an MFL module;
a brush module;
a patch set/test module;
a marker module; and

wherein each of the modules may be interconnected to construct one of an inspection device, a preparation device, a marking device, and a repair device.

(Amended) [28] 29. The device of claim [27] 28, further comprising a locomotor module.

(Amended) [29] 30. The device of claim [27] 28, further comprising at least one flexible connector for connecting at least two of the modules.

(Amended) [30] 31. The device of claim [27] 28, further comprising at least one centralizer connected to at least one of the modules.

(Amended) [31] 32. A method of repairing a pipe, comprising:

attaching a patch to a multi-module pipe inspection and repair device;
inserting the device into the pipe;
locating a flaw in the pipe using the device;
preparing the flaw for repair using the device;
patching the flaw with the patch using the device; and
removing the device from the pipe.

(Amended) [32] 33. A method of repairing a pipe, comprising:

inserting a marking device into the pipe;
marking at least one flaw in the pipe using the marking device;
removing the marking device from the pipe;
inserting a preparation device into the pipe;
preparing the flaw for repair using the preparation device;

removing the preparation device from the pipe;
inserting a patch module having a patch into the pipe;
repairing the flaw using the patch module; and
removing the patch module from the pipe.

(Amended) [33] 34. The method of claim [32] 33, further comprising preparing the pipe.

(Amended) [34] 35. The method of claim [33] 34, wherein preparing the pipe includes attaching an access system to the pipe and removing a portion of the pipe proximate the access system.

(Amended) [35] 36. The method of claim [32] 33, further comprising:

inserting an inspection device into the pipe;
inspecting the pipe using the inspection device; and
removing the inspection device.

(Amended) [36] 37. The method of claim [32] 33, wherein inserting a marking device into the pipe includes inserting a marking device having a base module, a marker module connected to the base module, and an MFL module connected to the marker module.

(Amended) [37] 38. The method of claim [32] 33, wherein inserting a preparation device into the pipe includes inserting a preparation device having a base module, a sensor module connected to the base module, and a brush module connected to the sensor module.

(Amended) [38] 39. The method of claim [32] 33, wherein inserting a patch module having a patch into the pipe includes inserting a patch module having a base module, a supply module connected to the base module, and a bladder module connected to the supply module.

(Amended) [39] 40. The method of claim [35] 36, wherein inserting an inspection device into the pipe includes inserting an inspection device having a base module and a camera module connected to the base module.

(Amended) [40] 41. The method of claim [32] 33, wherein preparing the flaw for repair using the preparation device includes abrading a wall of the pipe where the flaw is located.

(Amended) [41] 42. The method of claim [32] 33, wherein marking at least one flaw in the pipe using the marking device includes marking at least one flaw in the pipe with paint.

(Amended) [42] 43. The method of claim [32] 33, wherein repairing the flaw using the patch module includes affixing a flexible patch to a wall of the pipe.

(Amended) [43] 44. A pipe inspection and repair system, comprising:

- a coiled tubing unit having coiled tubing piping;
- a user interface in communication with the coiled tubing unit;
- a pipe access system connected to a pipe;
- a multi-module pipe inspection and repair device connected to the coiled tubing piping and adapted to enter the pipe through the pipe access system.

(Amended) [44] 45. The system of claim [43] 44, further comprising an interface connector connected between the coiled tubing unit and the device.

(Amended) [45] 46. The system of claim [43] 44, wherein the device includes:

- a base module;
- a camera module;
- a sensor module;
- an MFL module;
- a brush module;
- a patch set/test module;
- a marker module; and

wherein each of the modules may be interconnected to construct one of an inspection device, a preparation device, a marking device, and a repair device.

(Amended) [46] 47. The system of claim [45] 46, wherein the device further includes a locomotor module.

(Amended) [47] 48. The system of claim [43] 44, wherein the user interface includes:

- a controller board;
- a user interface board in communication with the controller board;
- a control panel in communication with the user interface board; and
- a monitor in communication with the controller board.

(Amended) [48] 49. The system of claim [43] 44, wherein the pipe access system includes:

- a sleeve attached to the pipe, the sleeve having a protruding portion;
- a valve assembly connected to the protruding portion; and
- an access tube connected to the valve assembly.

(Amended) [49] 50. The system of claim [48] 49, wherein the protruding portion is oriented at approximately a 20 degree angle relative to the pipe.

(Amended) [50] 51. The system of claim [48] 49, wherein the valve assembly includes one of a ball valve and a gate valve.

(Amended) [51] 52. The system of claim [43] 44, wherein the coiled tubing unit includes:

- a tether spool;
- a slip ring in communication with the spool and the user interface; and
- a tether odometer in communication with the user interface.

(Amended) [52] 53. A joint for connecting at least two modules of a multi-module pipe inspection and repair device, comprising:

- an end shell;
- a locking sleeve;

a spring connected between the end shell and the locking sleeve; and
a mesh connected between the end shell and the locking sleeve; wherein the mesh substantially surrounds the spring.

(Amended) [53] 54. The joint of claim [52] 53, wherein the locking sleeve includes at least one connector.

(Amended) [54] 55. The joint of claim [52] 53, wherein the spring creates a void, and further comprising a bundle connected to the locking sleeve, wherein the bundle is adapted to pass at least one of a fluid, a gas, and an electrical signal.